

## **Evolution of the Grain Boundary Character Distribution in Copper Shaped-Charge Liners**

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We have used orientation imaging microscopy (OIM) to study the evolution of the grain boundary character distribution in oxygen-free electronic (OFE) copper as a function of annealing time. OFE copper shaped-charge liner material was mechanically processed to obtain the usual conical shape. A metallographic sample was cut from the wall of the cone and polished on a through-thickness plane parallel to the axis of the cone. The grain boundary character distribution was characterized using OIM. The sample was subsequently annealed at 310°C in an argon sand bath for incremental times of 0.25, 1, 2, 27, and 87 hours. OIM was carried out after each anneal on a freshly polished surface. The observed trend was that the fraction of "random" grain boundaries ( $\Sigma \geq 29$ ) generally decreased with annealing while the grain size increased by less than a factor of two. It is known that grain boundaries have significant effects on the performance of copper shaped-charge jets. These results will be discussed in terms of the potential for their effect on the performance of comparably annealed shape-charge liners.

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